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BOOK REVIEWS

Quality Assurance in Analytical Chemistry
(Translated by Ann Gray)
by Werner Funk, Vera Dammann and Gerhild Donnevert
VCH · Weinheim-New York-Basel-Cambridge-Tokyo, 1995
256 pages, 90 figures; price · DM 125.00 (Hard cover); ISBN 3-527-28668-3

This book is a revised and updated version of the German edition that appeared in 1992. Today analytical chemistry touches every sphere of human life : water, soil, air, environment, pollution, foodstuff, pharmaceuticals, clinical diagnosis, crime detection *etc. etc*. In this scenario, quality assurance and quality control of the analytical methods are becoming increasingly important.

Technically, quality assurance means a system of activities which include quality management, quality planning, quality guidance and quality testing. And quality control means a defined set-up and follow-through for carrying out quality assurance. These and some forty other items which include entries such as statistical quality control, reliability, standard method, accuracy, precision, reproducibility, trueness, deviation, validation *etc.* constitute the first section of this book and is called Definitions.

This is followed by a 0-th chapter called Introduction which sets up a 4-phase model of analytical quality assurance. These phases are then elaborated one after the other in four chapters 1–4 constituting most of the book. Phase I called 'Establishing a new analytical procedure' deals with quality characterization procedures of new analytical processes in need of calibration, improvement and documentation. The procedure is succinctly set out in flowchart and a good summary is provided at the end. The objective of Phase II is to make a verified (ensured in Phase I) analytical process available for routine analysis. Phase III called 'Routine quality assurance' concerns the maintenance of the reliability that was achieved in the earlier phases and its continuing documentation. Phase IV entitled 'External analytical quality assurance' deals with the comparability of analytical results obtained by interlaboratory or round robin tests. There are sections on References, Appendix and Index at the end.

It is a very useful book written in a clear and concise manner. Its importance can only increase as analytical chemical methods make more and more inroads into human life and activities. I congratulate the authors for putting up this important volume.

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Ion Chromatography
(Second Edition)
by Joachim Weiss
VCH : Weinheim-New York-Basel-Cambridge-Tokyo, 1995
xi + 465 pages, illustrated; price DM 164 00 (Hard cover); ISBN 3-527-28698-5

The new edition of Joachim Weiss's book is a timely and welcome publication on an analytical technique, the application of which has grown rapidly in the recent years. The technique is only about two decades old and the related technique of Ion Exchange Chromatography was already well established when the chromatography of inorganic ions by the new technique was first reported. To many, ion chromatography still means chromatography of inorganic ions, but its application has been extended to such non-ionic compounds as carbohydrates with excellent results.

The Introduction of the book is followed by a short chapter on Theory of Chromatography. The theory of chromatographic separation, is generally neglected by most users of the technique. The clarity and brevity with which Weiss treated this aspect will hopefully encourage the readers not to skip the chapter. The three modes of ion chromatographic separation *i.e.* Ion Exchange, Ion Exclusion and Ion Pairing were discussed in three chapters — the first one taking up the maximum space. To the rieviewer, this part of the book seems to be most valuable because the treatment is very systematic.

The effects of stationary phase and eluent and analyte properties on chromatographic resolution has been discussed with appropriate chromatograms.

The abundance of the illustrations will make the learning easy for the beginner and satisfy the practising chromatographer for whom "only seeing is believing". The phenomenal growth of ion chromatography was due to development of low capacity, high efficiency columns and detector systems. The stationary phase chemistry has been discussed adequately through not exhaustively in these chapters.

Since detectors play such a vital role in successful application of ion chromatography, the principles and applications of different detectors were deservedly

discussed in a separate chapter. The last two chapters of the book deals with qualitative analysis and applications of ion chromatography in different fields. The statistical analysis of data has not been treated adequately but the chapter on applications will serve as a good introduction to anybody desiring to use the technique. There are some misstatements like "all acids with high acid strengths are not retained" (p. 3) when it was intended to say that strong acids are not retained. But such examples are rare and are possibly a consequence of transliteration of the original German text to English. Within the limit of the size of the book, the coverage is comprehensive, the production is excellent and is recommended to both the beginner and the expert. Somebody can write a better book on ion chromatography but it will not be an easy job.

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Process Scale Liquid Chromatography

by G Subramanian
VCH Weinheim-New York-Basel-Cambridge-Tokyo, 1995
xvi + 225 pages, illustrated, price · DM 178 00, ÖS 1388, sFr 165 (Hard cover); ISBN 3-527-28672-1

With this book, the authors provide chemists, biochemists and industrial chromatographers a theoretical basis for the understanding and practical application of liquid chromatography in large-scale separations. The importance of preparative and process-scale liquid chromatography was discussed not only in terms of a research and development tool but also as a viable alternative to more traditional purification techniques in the production environment. The basic theory is presented, guiding the reader through system design, simulation and modelling techniques, giving due consideration to economic aspects as well as safety and regulatory factors.

The chapters of the book are written by acknowledged experts from Europe and the United States. Each chapter represents an overview of its chosen topic. Relevant references are appended at the end of each chapter and covers the literature upto the end of 1993. The subject matter of each chapter was explained with the help of figures and diagrams.

Chapter 1 describes chromatography systems, designs, control systems, component selection and instrumentation for process-scale separations. The current state of theory in large-scale separation by liquid chromatography is discussed in Chapter 2. Chapter 3 of the book describes the alternative modes of operation of chromatography columns in the process situation. This includes elution chromatography, displacement chromatography and frontal chromatography.

The application of size-exclusion chromatography in process-scale purification of proteins involving a discussion on separation principle, column packing material, adsorption effects and influence of the eluent were provided in Chapter 4. Application of synthetic and natural polymers in liquid chromatography is described in Chapter 5. The discussion included the nature of polymer support suitable for liquid chromatography and types of matrices such as polystyrene, polyacrylamide, dextran, agarose, cellulose *etc.* used in liquid chromatography. Utilisation of surface coating, pellicular supports and interpenetrating network are also discussed. Reversed phase chromatography, ion exchange fractionation, affinity chromatography and chiral separations are also discussed in Chapters 5 and 6. Principle of ion-exchange chromatography and its application in biochemical separations is discussed in detail with the help of several examples.

Instrument design for industrial supercritical-fluid chromatography (SFC) and its application in industrial separation and the scaling up of supercritical-fluid chromatography to large-scale applications are described in Chapters 7 and 8. Principle, advantages and drawbacks of such chromatography are discussed in the light of technology, separation costs and applications. Choice of super-critical fluid was shown to be an important factor. Designing the basic super-critical-fluid chromatograph, loading and injection of samples, construction of the sample introduction pressure vessel collection of fractions and high pressure trapping were discussed. The author also considered the development of large scale commercial systems and some recent developments in SFC and SFE. Affinity chromatography and its application in large scale separations is reviewed in Chapter 9. With nice diagrams, the author explained the principles of affinity chromatography. The support matrix, important features of a ligand, coupling of a ligand to the support matrix *etc* were discussed. Activation of the matrix capacity of the adsorbent and ligand leakage were also considered. Process design, process control and chromatography conditions were explained. Finally, examples of some large-scale affinity methods as applied for the separation of protein G, streptavidin, glucokinase and glycerokinase and human serum albumin were provide.

The book will therefore be of great interest to all chromatographers. More generally the book will be useful to students, newcomers to the field of industrial chromatography and for teaching purpose.

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